wide; involucre 7–10 mm. high, glandular, sparsely to moderately villous with flattened hairs; phyllaries green, purplish above, especially on the margins, or the inner purplish throughout, acute to attenuate-acuminate, in 2 to 3 equal series; ligules about 20, blue, 10 mm. long, 2 mm. wide; disk-corollas about 5.9–6.5 mm. long, the tube 1.8–2.3 mm., the lobes 0.6–0.8 mm.; style-appendages lanceolate or lance-subulate, acute to acuminate, 0.4–0.5 mm. long; achenes obscurely several-nerved, pubescent with stiff appressed brown-based hairs; pappus of about 35–40 slightly sordid or faintly purplish bristles, with a few obscure and slender short setae visible at 50 diameters magnification.

Type. South end of Lake Kluane, southwestern Yukon, July 23, 1944, *J. P. Anderson 9384* (Herbarium of the New York Botanical Garden). An isotype is retained in Mr. Anderson's collection at Iowa State College, Ames, Iowa, and another is included in the set laid aside for the University of Lund, Sweden.

New York Botanical Garden,
New York City, New York.

TWO TIOID ASTRAGALUS NOVELTIES FROM THE ROCKY MOUNTAIN REGION[1]

C. L. Porter

Astragalus (*Tium*) racemosus Pursh var. **typicus** nom. nov. *A. racemosus* Pursh, Fl. Am. Sept. 740. 1814.

Astragalus (*Tium*) racemosus Pursh var. **Treleasei** var. nov. A var. *typicus* differt: carina in apice purpurascenta; leguminibus ovato-lanceolatis, 10–20 mm. longis et 4–7 mm. latis.

Differing from var. *typicus* in having the keel of the flowers with a prominent purple tip, and pods which are ovate-lanceolate in outline, the body 10–20 mm. long and 4–7 mm. wide.

Specimens examined. Wyoming. Uinta County: between Carter and Lyman, spring of 1940, *O. A. Beath 125* (type, Rocky Mountain Herbarium, University of Wyoming; isotype, Gray Herbarium, Harvard University); shale outcropping, bluffs of Blacks Fork River, 3 miles north of Lyman, June 10, 1937, *Reed C. Rollins 1650*. Utah. Duchesne County: on the Wasatch formation near Duchesne, June 16, 1940, *O. A. Beath G–509;* 3 miles west of Duchesne, 1941, *Sam F. Trelease H–481;* in cultivation on University of Wyoming campus (seed collected in 1940 by O. A. Beath near Duchesne), July 28, 1943, *C. L. Porter 3300*. All of these collections are deposited in the Rocky Mountain Herbarium.

It was at first thought that this novelty was merely an aberrant form of the species or possibly a hybrid, but it has been found that var. *typicus* does not occur in either of the regions where var.

[1] Contribution no. 199 from the Department of Botany and the Rocky Mountain Herbarium of the University of Wyoming, Laramie.

Treleasei is common (the former having a more eastern range), and the fact that it has been grown successfully from seed and that such plants retain the characters of the parents suggests at least varietal rank. It is a pleasure to name it for Dr. Sam F. Trelease who has not only collected the plants in the field but who has contributed much to our knowledge of seleniferous vegetation which includes many Astragali.

In this connection it is interesting to note that recent studies by Beath *et al.* (1) and by Trelease (2) indicate that the presence of selenium in significant quantities in certain species of *Astragalus,* and the corresponding lack of that element in others when growing under similar conditions, constitutes what might well be a valuable clue to taxonomic affinities. In this case, for instance, it has been found that whereas *Astragalus racemosus* var. *typicus* commonly contains from several hundred to several thousand parts per million of selenium, var. *Treleasei* has never been found to contain more than 100 parts per million, and when the two were grown under similar conditions experimentally it was found that var. *typicus* consistently contained about five times the selenium found to be present in var. *Treleasei.*

Astragalus (*Tium*) **Schmollae** sp. nov. Herba perennis, caulibus erectis, circa 5 dm. altis, striatis, purpureis inferiore viridibus superiore, ramosis a base strigosis, pilis albis planis appressis; foliis pinnatis, 5–10 cm. longis, pallenter viridibus, strigosis, foliolis plerumque 11 ad 13, oblongo-linearibus, 1–3 mm. latis, 10–30 mm. longis, apice rotunda, base paullo abrupte contracta ad petiolulam 0.5–1 mm. longam; stipulae triangulares, 1–2 mm. latae base, 1–2 mm. longae, strigosae in marginibus; flores in racemis terminalibus 5–15 cm. longae; calyx viridis, pubescente strigosa nigra, tubus circa 6 mm. longus, 3 mm. latus, dentibus lanceolatis, circa 1 mm. longis; corolla ochroleuca, circa 15 mm. longa, vexillo mediocriter arcuato; legumen coriaceum, fere rectum immaturitate sed maturitate sutura dorsali concava, sutura ventrali convexa, valve recurvescente, 25–40 mm. longum, 3–4 mm. latum, sutura sulcata dorsali, sectione transversa obcordata, absente septo interno; stipe 7–10 mm. longo, calicem excedente; semina circa 10 usque ad 15 ad legumen, reniformata.

Plants perennial, the stems apparently erect, about 5 dm. high, striate, purplish below, green above, branching from the base, strigose with flat appressed white hairs; leaves pinnate, 5–10 cm. long, pale green and strigose, the leaflets mostly 11 to 13, oblong-linear, 1–3 mm. wide and 10–30 mm. long, the apex rounded, the base rather abruptly contracted to a petiolule 0.5–1 mm. long; stipules triangular, 1–2 mm. wide at the base and 1–2 mm. long, strigose on the margins; flowers in a terminal raceme 5–15 cm. long; calyx green, with black strigose pubescence, the tube about 6 mm. long and 3 mm. wide, the teeth lanceolate, about 1 mm.

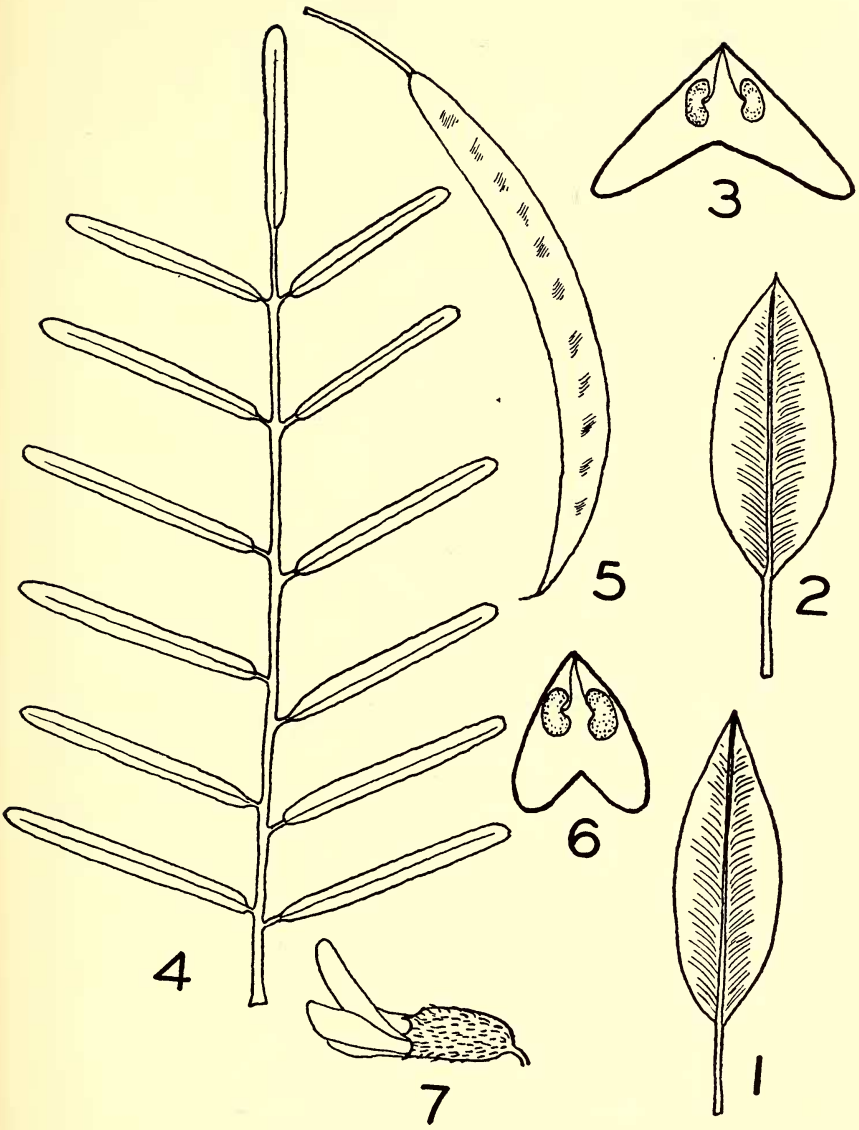

PLATE 9. ASTRAGALUS. FIGS. 1–3, *Astragalus racemosus* var. *Treleasei*: *1, 2,* pods, ×2; *3,* median cross section of pod, ×5. FIGS. 4–7, *A. Schmollae*: *4,* leaf, ×2; *5,* mature pod, ×2; *6,* median cross section of pod, ×5; *7,* flower, ×2.

long; corolla ochroleucous, about 15 mm. long, the banner moderately arched; fruit leathery, nearly straight when young but at maturity the dorsal suture concave and the ventral suture convex making the pod recurved, 25–40 mm. long and 3–4 mm. wide, sulcate on the dorsal suture, the cross section obcordate and without an internal septum; stipe 7–10 mm. long, exceeding the calyx; seeds about 10 to 15 in each pod, reniform.

Type. Northwest of Spruce Tree House, Mesa Verde National Park, Colorado, 6800 feet, May 26, 1925, *Hazel M. Schmoll & Deric Nusbaum 1555* (Rocky Mountain Herbarium no. 105889, flowers, no. 105888, fruit). Cotype. Among junipers, Mesa Verde National Park, Colorado, May 12, 1925, *A. Nelson 10420* (Rocky Mountain Herbarium).

The relationships of this species are not clear, but it appears to have the most in common with the Section *Racemosa* as defined by Rydberg. The recurved pod also suggests *Astragalus recurvus* Greene in the Section *Atrata,* but the large flowers, long stipe, and coarse nature of the plants are not in keeping with that group.

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Literature Cited

1. Beath, O. A., C. S. Gilbert, and H. F. Eppson. Am. Jour. Bot. 26: 257–269, 296–315. 1939.
2. Trelease, Sam F., and Helen M. Trelease. *Loc. cit.* 25: 372–380. 1938.

REVIEWS

Experimental Studies on the Nature of Species. II. Plant Evolution through Amphiploidy and Autoploidy, with Examples from the Madiinae. By Jens Clausen, David D. Keck, William M. Hiesey. Carnegie Institution of Washington Publ. 564: viii + 174. 1945.

Part two of "Experimental studies on the nature of species" consists of well-documented discussions of the role of amphiploidy and autoploidy in the reticulate type of evolution that characterizes groups at or below the taxonomic level of genera and species. The documentation is chiefly of data resulting from the experimental synthesis of amphiploids. After cytogenetic investigation their interpretation follows biosystematic principles. Many experimental polyploids developed by others are reviewed and interpreted along the biosystematic pattern. The term "autoploidy" is restricted to "the multiplication of genomes within one ecospecies," while "amphiploidy" involves the addition of the genomes of two distinct species.

The authors point to the organization of living things being in a sort of equilibrium between genetic and ecologic processes. "The natural species consists of individuals whose genes are in internal balance so that a harmonious physiologic and morphologic development is assured generation after generation." The